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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,458	08/20/2001	Genzo Iwaki	3008-35	3388

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EXAMINER

KOPEC, MARK T

ART UNIT	PAPER NUMBER
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1751

DATE MAILED: 02/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/932,458	IWAKI ET AL.	
	Examiner	Art Unit	
	Mark Kopec	1751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 6) <input type="checkbox"/> Other: |

Art Unit: 1751

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terminology "a lot of niobium" is a relative term which renders the claim indefinite. The term is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in

Art Unit: 1751

the art would not be reasonably apprised of the scope of the invention. Applicant is suggested to amend the instant language to --a plurality of niobium filaments--.

The instant claims, drawn to an Nb₃Sn-based superconductive wire, recite various process steps by which the wire is formed (i.e. product-by-process). However, no Nb₃-Sn formation step is specified. Applicant is suggested to add the following language to the end of claim 1: --heat-treat said aggregate to form said Nb₃-Sn-based superconductive wire--.

The instant claims are indefinite in that both required components of the "composite filament" (i.e. *niobium/niobium alloy filament* component and the *reinforcing material* component) may be the same material(s), specifically niobium alloy.

There is no per se rule that "double inclusion" is improper in a claim. The governing consideration is not double inclusion, but rather is what is a reasonable construction of the language of the claims."). The facts in each case must be evaluated to determine whether or not the multiple inclusion of one or more elements in a claim gives rise to indefiniteness in that claim. The mere fact that a compound may be embraced by more than one member of a Markush group recited in the claim does not lead to any uncertainty as to the scope of that claim for either examination or infringement purposes. On the other hand, where a

Art Unit: 1751

claim directed to a device can be read to include the same element twice, the claim may be indefinite. Ex parte Kristensen, 10 USPQ2d 1701 (Bd. Pat. App. & Inter. 1989). Claims in which one component is defined so broadly that it reads on a second, fail to meet the requirements of the second paragraph of 35 U.S.C. 112. See Ex parte Ferm et al. 162 U.S.P.Q. 504.

For examination purposes, the examiner construes a bronze/niobium alloy multifilament to meet every requirement for **both** the *niobium/niobium alloy filament* component and the *reinforcing material* component.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Flukiger (4,746,581), Yu (5,364,709), or Kubo et al (5,926,942).

Flukiger (4,746,581) discloses a multifilamentary, copper or copper alloy clad superconductive wire, comprising a superconductive, intermetallic compound $\text{Nb}_{0.3}\text{Sn}$ or $\text{V}_{0.3}\text{Ga}$, having an A-15 crystal structure, and at least one additive metal from the group consisting of rare earth elements of atomic number 57 to 71, Th, U, **Ti**, **Zr**, **Hf**, **V**, **Nb**, **Ta**, **Mo**, Fe, Co, Ni, Pd, Cu, Ag, Al, and Pt. The additive is present in the wire within the A-15 phase in the form of uniformly and finely

Art Unit: 1751

distributed, at least partially undissolved axially parallel inclusions at grain boundaries of the crystals and/or at an interface between the A-15 phase and the copper or copper alloy, or at an interface between the A-15 phase and a separate phase (Abstract; Col 2, lines 33-55). The inclusions generally have radial dimensions of 0.5 μm or less. In a preferred embodiment of the invention, the inclusions have radial dimensions of less than 0.1 μm . It is also preferred that the inclusions be of axially parallel configuration. The sum of the additives in the inclusions range from 0.1 weight % to 50 weight %, with reference to the Nb component in the A-15 phase in the case of Nb_3Sn and with reference to the V component in the A-15 phase in the case of V_3Ga (Col 2, lines 60-65). Customary methods for producing Nb_3Sn or V_3Ga multifilamentary superconductive wires (process step c above) are the bronze method (A. R. Kaufmann and J. J. Picket, J. Appl. Phys. 42, 58 (1971) wherein Sn diffuses from the Cu-Sn bronze (which is formed only at the beginning of the desired reaction) and reacts with Nb to form Nb_3Sn (Col 4, lines 11-52; example 1). The reference either specifically or inherently meets each of the claimed limitations.

Art Unit: 1751

Yu (5,364,709) discloses a superconducting article has a matrix core containing a superconductor, a copper stabilizer layer disposed about the core, and an insulating layer surrounding the copper stabilizer layer. The insulating layer is a metallurgically bonded layer of a refractory metal selected from Nb, Ta, V, and Mo (Abstract). A preferred embodiment of the invention is shown in FIG. 1. A bronze (e.g., Cu--Sn) matrix 1 contains a plurality of niobium filaments 2. The matrix is surrounded by a tantalum barrier 3, and a copper stabilizer 4. The features 1-4 are typical for a bronze route Nb.sub.3 SN superconductor strand. The remaining features are characteristic of the invention. The niobium cladding 5 is the insulating surface to eventually be exposed by chemical means. A thin iron layer 6 is provided for a drawing surface. A titanium etching barrier 7 is incorporated to separate the copper extrusion jacket 8 and the iron drawing surface 6 (Col 3, lines 36-45). See also example 1. The reference either specifically or inherently meets each of the claimed limitations.

Kubo et al (5,926,942) discloses A compound superconducting wire comprising a matrix of CuX alloy and a multiplicity of Z.sub.3 X filaments embedded in the matrix in a spaced relationship so as not to come into contact with each other

Art Unit: 1751

wherein X is Sn or Ga and $Z \cdot \text{sub} \cdot 3$ X is $\text{Nb} \cdot \text{sub} \cdot 3$ Sn or $\text{V} \cdot \text{sub} \cdot 3$ Ga (Abstract). In accordance with a first aspect of the present invention, there is provided an Nb-Sn compound superconducting wire comprising a matrix of a bronze having a low Sn concentration and a multiplicity of $\text{Nb} \cdot \text{sub} \cdot 3$ Sn filaments arranged in said matrix, wherein a center portion of the superconducting wire is formed of only said bronze, and said $\text{Nb} \cdot \text{sub} \cdot 3$ Sn filaments are concentrically outwardly arranged in layers around said center portion separately from each other (Col 3, lines 30-35). The composite body is, as occasion demands, covered with a barrier material against Sn diffusion, for example, Ta, and further with a stabilizing material, and is drawn to form the superconducting wire precursor. The precursor is then subjected to a preheating at a temperature of 300.degree. to 600.degree. C. to diffuse the centrally-located Sn base metal material into the Cu base metal surrounding each Nb filament, thereby producing bronze. Further, the resultant is subjected to a heat treatment at a temperature of 600.degree. to 800.degree. C. to provide the superconducting wire. A stabilizing material may be provided for forming a layer which will not be turned into bronze even by the heat treatment. In general the stabilizing layer is provided as the outermost layer, but its location is not limited to the outermost portion of the wire and it may be

Art Unit: 1751

provided in the inner portion of the superconducting wire. The provision of the stabilizing material layer allows to obtain a superconducting wire which is more stable against electrical and thermal treatments. The stabilizing material includes Cu, Al having high purity, or the like. To avoid such bronzing, it is advantageous that a barrier layer for blocking Sn diffusion is provided usually between the Sn-Cu composite body and the stabilizing layer. The material for the barrier layer is preferably Ta, but Nb, V or the like is also usable (Col 10, lines 4-28). The reference either specifically or inherently meets each of the claimed limitations.

The references are anticipatory.

In the alternative that any minor modifications are necessary to meet the claimed limitations, such as variation in filament diameter or percentages of "reinforcing material", such modifications are well within the purview of the skilled artisan.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tateishi et al (IEEE).

Tateishi discloses fiber-reinforced niobium-tin superconductor fabricated by bronze process. The superconductors

Art Unit: 1751

comprise niobium-tin filament having a tantalum core (Abstract; Table 1; Figures 1-3). The reference either specifically or inherently meets each of the claimed limitations.

The references are anticipatory.

In the alternative that any minor modifications are necessary to meet the claimed limitations, such as variation in filament diameter or percentages of "reinforcing material", such modifications are well within the purview of the skilled artisan.

Claims 1-5 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kondoh et al (IEEE Transactions...).

Kondoh et al disclose Tantalum core-reinforced Niobium-Tin superconductor composites (Abstract; Introduction). Each niobium filament has a Ta core and is embedded in a matrix of bronze. Copper stabilizer is located at the surface and the Ta barrier layer separates the filament bundle and the copper (Section II and Section V discussion). The reference either specifically or inherently meets each of the claimed limitations.

The references are anticipatory.

Art Unit: 1751

In the alternative that any minor modifications are necessary to meet the claimed limitations, such as variation in filament diameter or percentages of "reinforcing material", such modifications are well within the purview of the skilled artisan.

In view of the foregoing, the above claims have failed to patentably distinguish over the applied art.

Applicant is reminded that any evidence to be presented in accordance with 37 C.F.R. 1.131 or 1.132 should be submitted before final rejection in order to be considered timely.

The remaining references listed on forms 892 and 1449 have been reviewed by the examiner and are considered to be cumulative to or less material than the prior art references relied upon in the rejection above.

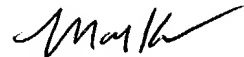
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Kopec whose telephone number is (571) 272-1319. The examiner can normally be reached on Monday - Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the

Art Unit: 1751

organization where this application or proceeding is assigned is
(703) 872-9306.

Any inquiry of a general nature or relating to the status
of this application or proceeding should be directed to the
receptionist whose telephone number is (571) 272-1300.



Mark Kopec
Primary Examiner
Art Unit 1751

MK

January 27, 2004